

Remarks/Arguments

The present remarks are essentially a summary of the Examiner's rejection including comments where the applicant may respectfully indicate a different opinion relative to certain aspects of the rejection.

Claims 1-34 were rejected under 35 USC 102(b) as being anticipated by Cole et al. (5,550,373). The Examiner stated that Cole et al. disclose an adaptive sensor and means for detecting light using the adaptive sensor where the sensor comprises a plurality of detectors (14) and a plurality of adjustable filters (74) proximately to the plurality of detectors (14) (Figure 4). There may be a plurality of Fabry-Perot cavities that act as filters for the respective detectors in Cole et al. The cavities may be adjustable but they are adjusted together but are not individually or independently adjustable.

As to claim 16, the Examiner said that Cole et al. disclose means for detecting light and filtering light and that the light filter has an adjustable bandpass. As to claims 21 and 22, the Examiner indicated that Cole et al. disclose a method comprising a step of providing a detector, placing a filter proximate to the detector and adjusting the filter to a desired wavelength, and directing the filter and detector towards a target. As to claims 24, 25 and 26, the Examiner said that Cole et al. disclose an array of detectors and an array of tunable etalons. The Examiner seemed to indicate that each etalon is independently tunable in Cole et al. to provide a narrow and broad transmittance of light to a detector of the array. The

applicant in part respectfully disagrees with the independent aspect. In Cole et al., such as Figure 4, there may be a plurality of cavities 74 with mirrors 76 and 78 that might have different distance adjustments relative to each other, the tuning or the adjustment of the mirrors is done simultaneously for all the filters or cavities 74. All of the mirrors 76 are fixed to the top portion 32 of the package and the mirrors 78 are fixed to the bridge 24. The mirrors 78 move together relative to mirrors 76 when the bridge 24 is moved up or down by the set of actuators 26. Thus, one cavity 74 may be tuned but the tuning of the remaining cavities 74 will be affected at the same time.

As to claims 2 and 7, the Examiner indicated that the filters in Cole et al. are Fabry-Perot bandpass filters. As to claims 3-5 and 17, the Examiner indicated that Cole et al. disclose a plurality of electrostatic actuators (26) connected to the adjustable filters which are adjusted by the actuators. The applicant respectfully disagrees that the actuators of Cole et al. are electrostatic ones. Cole et al. actually promote and use piezoelectric (PZT) actuators which of course may have actuator electrodes 56 and capacitive sense electrodes 28 for sensing distances associated with PZT actuators. Cole et al. indicate that piezoelectric actuators are fast in comparison to other types of actuators such as thermal bimorphs. Cole et al. say that, unlike capacitors, PZT actuators 26 leave the majority of the real estate or area of the chip available for IR transmission. Cole et al. add that PZT forces and displacements are linear with voltage, unlike capacitance actuation in which the forces diminish inversely with spacing. Cole et al. do not

literally seem to mention electrostatic actuators but to the extent that capacitance actuation is concerned, Cole et al. do not appear to use them but rather teach away from the use of electrostatic or capacitative actuation. (Col. 2, line 60 to col. 3, line 25.)

As to claim 6, the Examiner indicates that the plurality of detectors is a bolometer. The usage of the term "bolometer" could vary from an individual detector to a group of detectors. As to claims 8 and 20, the Examiner indicated that Cole et al. disclose that the filters, actuators and detectors are situated in a package. Then the Examiner added that as to claims 9-11, 29 and 31, Cole et al. disclose that the plurality of detectors are situated on a first wafer (chip) (12) and that the adjustable filters or etalons are situated on a second wafer (chip) (32), where the second wafer 32 is a topcap situated on the first wafer, thus enclosing the plurality of detectors and filters (Figure 4) and so that the etalon is aligned with the detector. Also indicated by the Examiner was that Cole et al. disclose that the first and second wafers form an integrated vacuum package.

As to claims 13, 14, 18, 19, 23, 27 and 28, the Examiner indicated that Cole et al. disclose that each filter may be adjusted to pass a narrow or broad band of light. This may be true if one filter is tuned to a narrow band (2.5 to 5.5 microns) of light and another filter is tuned to a broad band (8 to 12 microns) of light for a given position of the bridge 24 supporting one portion of the filters (e.g., one set of mirrors). However, if the one filter is tuned to the narrow band of light and the other filter is not tuned to the broad

band of light, the bridge 24 may be moved by actuators 26 so as to adjust the other filter to the broad band of light but the one filter might no longer be tuned to the narrow band. In Cole et al., one cannot retune the one filter back to the narrow band without affecting the tuning of the other filter to the broad band. That is because the filters are not individually and independently tunable apart from the other filters in Cole et al. The tuning of all the filters is simultaneously affected by the support or bridge 24 movement.

As to claim 15, the Examiner indicated that the second wafer can contain an IR transmissive window. As to claim 30, the Examiner indicated that Cole et al. disclose that the detectors form an array of bolometers, the etalons are Fabry-Perot etalons and that the actuators are electrostatic actuators. As to the actuators being electrostatic actuators, the applicant respectfully disagrees. As noted in another place of this response, Cole et al. use piezoelectric (PZT) actuators 26. Cole et al. note that PZT actuators are fast in comparison to other actuators. Cole et al. do not literally mention "electrostatic actuators" and do not indicate them as part of their detector, but they do indicate disadvantages (e.g., usage of much chip area) of capacitor actuators, and thus appear to teach away from capacitor-like actuation, especially for their detector.

As to claims 32, 33 and 34, Cole et al., according to the Examiner, disclose the integrated package as sealed from the ambient environment, and a die-to-die or wafer-to-wafer bonding of the wafers (chips).

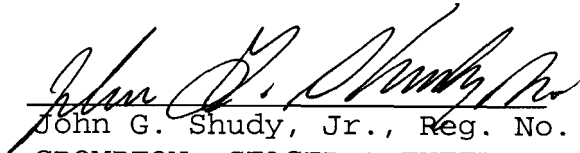
Claims 1, 2, 16 and 21 were rejected by the Examiner under 35 USC 102(e) as being anticipated by Harling et al. (6,222,454). The Examiner indicated that Harling et al. disclose an adaptive sensor comprising a plurality of detectors (21a, 21b) and a plurality of adjustable bandpass filters (51a, 51b) proximate to the plurality of detectors. The Examiner added that the method of detecting includes providing a detector, placing the filter proximate to the detector, adjusting the filter to a desired wavelength and directing the filter and detector toward a target. The applicant respectfully tends to disagree with the Examiner relative to the feature of adjusting the filter, post-fabrication or at least dynamically, to a desired wavelength. The temperature sensing device of Harling et al. appears to have a pair of infrared sensors (e.g., bolometers) of which one sensor is for sensing one spectral band and the other sensor is for sensing another spectral band. To attain different spectral bands of sensing, filters (51a, 51b) are used. The spectral bands of the filters appear to be set and designed at the time of fabrication of the sensing device. The elements (51a, 51b) for the two bands may be multi-layer thin film filters either located on flat windows or on diffractive microlenses (51a', 51b'). No mechanism for tuning or adjusting the bands after the device is built appears to be disclosed in Harling et al. The bands may be selected for the device but are not tuned or adjusted after fabrication or installation. The bands may be selected according to their emissivities. The adjustment relates to focusing of the radiation even though the focusing lens may also be a filter, such as the microlenses (51a', 51b'). The calibration of the

device involves obtaining the gain and offset value of the detectors, through measuring two different blackbody temperatures. Another approach may be to compare an uncorrected ratio with a look-up table constructed from a series of measurements.

Claims 1-34 are cancelled without prejudice and effectively rewritten as claims 35-68 with better clarification of the features of the present invention. Reconsideration and allowability of the pending claims are very respectfully requested.

Respectfully submitted,

Dated: 03-14-06


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